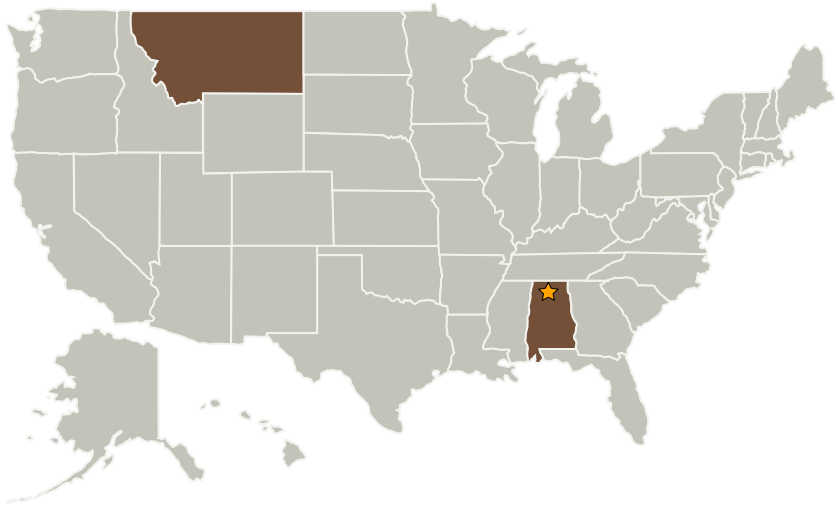
Low Permeability Polyimide Insulation, Phase I

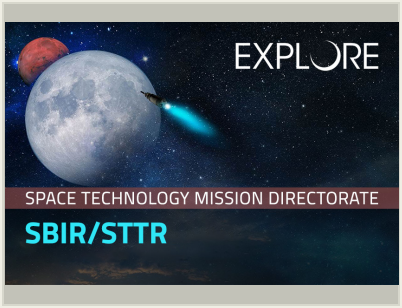
Completed Technology Project (2005 - 2005)

Project Introduction

Resodyn Technologies proposes a new technology that enables the application of polyimide based cryogenic insulation with low hydrogen permeability. This effort supports the Vision for U.S. Space Exploration policy and the Exploration Systems Enterprise. This technology will benefit designers of cryogenic fuel tanks envisioned for new Earth-to-Orbit (ETO) Transportation vehicles. Specifically the need exists to reduce the loss of hydrogen through the walls of the proposed carbon/polymer composite cryogenic fuel tanks in order to achieve zero boiloff long-term storage capability. Resodyn Corporation's proposed use of its Thermal Spray Technology will enable the processing of engineered materials, high performance polymers, and high temperature foams that have not been possible to date. One example investigated will be a combination of polyimide micro-balloons in a liquid crystal polymer (LCP) matrix. Also contained in this foam would be a dispersion of reflective glass microspheres. This combination of materials provides insulation, a hydrogen barrier and a thermal radiation barrier. Foam samples will be fabricated and evaluated for physical and mechanical properties including density, compressive and shear strength, permeability, and insulative qualities. This new foam is referred to as Multi-functional Cryogenic Insulation (MCI).

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Resodyn Corporation	Supporting Organization	Industry	Butte, Montana

Primary U.S. Work Locations	
Alabama	Montana

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Scott Coguill

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.4 Insulation and Interfaces